

CLAIMS

WE CLAIM AS OUR INVENTION:

1. A method of manufacturing a hybrid structure comprising:
5 applying a plurality of ceramic tiles to a surface of a mold;
applying a layer of ceramic matrix composite material over the ceramic tiles to
bond the plurality of ceramic tiles together with the ceramic matrix composite material;
and
removing the mold.

10 2. The method of claim 1, further comprising forming the ceramic tiles to
comprise a contour conformably matched to a contour of the surface of the mold.

15 3. The method of claim 1, further comprising forming the mold to comprise a
fugitive material portion.

4. The method of claim 1, further comprising machining an outer surface of
the plurality of tiles with the tiles supported by the mold prior to the step of applying the
layer of ceramic matrix composite material.

20 5. The method of claim 1, further comprising at least partially filling gaps
between adjacent tiles with a filler material prior to the step of applying a layer of
ceramic matrix composite material over the ceramic tiles.

25 6. The method of claim 1, further comprising at least partially filling gaps
between adjacent tiles with a filler material after the step of removing the mold.

7. The method of claim 1, further comprising machining an inside surface of
the plurality of ceramic tiles to a desired contour after the step of removing the mold.

8. The method of claim 1, further comprising:
filling gaps between adjacent tiles with a filler material after the step of removing
the mold; and
firing the tiles, the ceramic matrix composite material and the filler material
5 together to form a hybrid structure for use in a high temperature environment.

9. The method of claim 1, further comprising:
applying ceramic tiles having a first composition to a first portion of the surface of
the mold; and
10 applying ceramic tiles having a second composition different than the first
composition to a second portion of the surface of the mold.

10. The method of claim 1, further comprising:
applying ceramic tiles having first size to a first portion of the surface of the mold;
15 and
applying ceramic tiles having a second size different than the first size to a
second portion of the surface of the mold.

11. The method of claim 1, further comprising preparing a surface of at least a
20 portion of the tiles with a surface contour operation.

12. The method of claim 1, further comprising preparing a surface of at least a
portion of the tiles by applying a surface coating material.

13. A method of manufacturing a gas turbine combustor component comprising a ceramic matrix composite structural member having a layer of ceramic insulating material disposed on an inside surface and defining a passageway for hot combustion gasses, the method comprising:

5 providing a mold comprising a fugitive material;
 attaching a plurality of ceramic insulating tiles to a surface of the mold;
 applying a layer of ceramic matrix composite material over the ceramic insulating tiles to bond the tiles together with the ceramic matrix composite material; and
 transforming the fugitive material and removing the mold.

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14. The method of claim 13, further comprising:
 filling gaps between the tiles with a ceramic filler material; and
 firing the tiles, the ceramic matrix composite material and the filler material together after the step of removing the mold.

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15. The method of claim 14, further comprising filling the gaps prior to the step of applying the layer of ceramic matrix composite material over the tiles.

16. The method of claim 14, further comprising filling the gaps after the step of
20 removing the mold.

17. The method of claim 13, further comprising forming the ceramic tiles to comprise a contour conformably matched to a contour of the surface of the mold.

25 18. The method of claim 13, further comprising machining an outer surface of the plurality of tiles with the tiles supported by the mold prior to the step of applying the layer of ceramic matrix composite material.

30 19. The method of claim 13, further comprising machining an inside surface of the plurality of ceramic tiles to a desired contour after the step of removing the mold.

20. The method of claim 13, further comprising:
applying ceramic tiles having a first composition to a first portion of the surface of
the mold; and
applying ceramic tiles having a second composition different than the first
5 composition to a second portion of the surface of the mold.

21. The method of claim 13, further comprising:
applying ceramic tiles having a first size to a first portion of the surface of the
mold; and

10 applying ceramic tiles having a second size different than the first size to a
second portion of the surface of the mold.

22. The method of claim 13, further comprising preparing a surface of at least
a portion of the tiles with a surface contour operation.

15 23. The method of claim 13, further comprising preparing a surface of at least
a portion of the tiles by applying a surface coating material.

24. A hybrid structure for a gas turbine comprising:
20 a layer of ceramic matrix composite material;
a plurality of ceramic tiles bonded to a surface of the ceramic matrix composite
material;

wherein the ceramic tiles bonded a first region of the ceramic matrix composite
material are different in at least one of the group of composition and size than the
25 ceramic tiles bonded to a second region of the ceramic matrix composite material.